Oakland ARTCC Introduction

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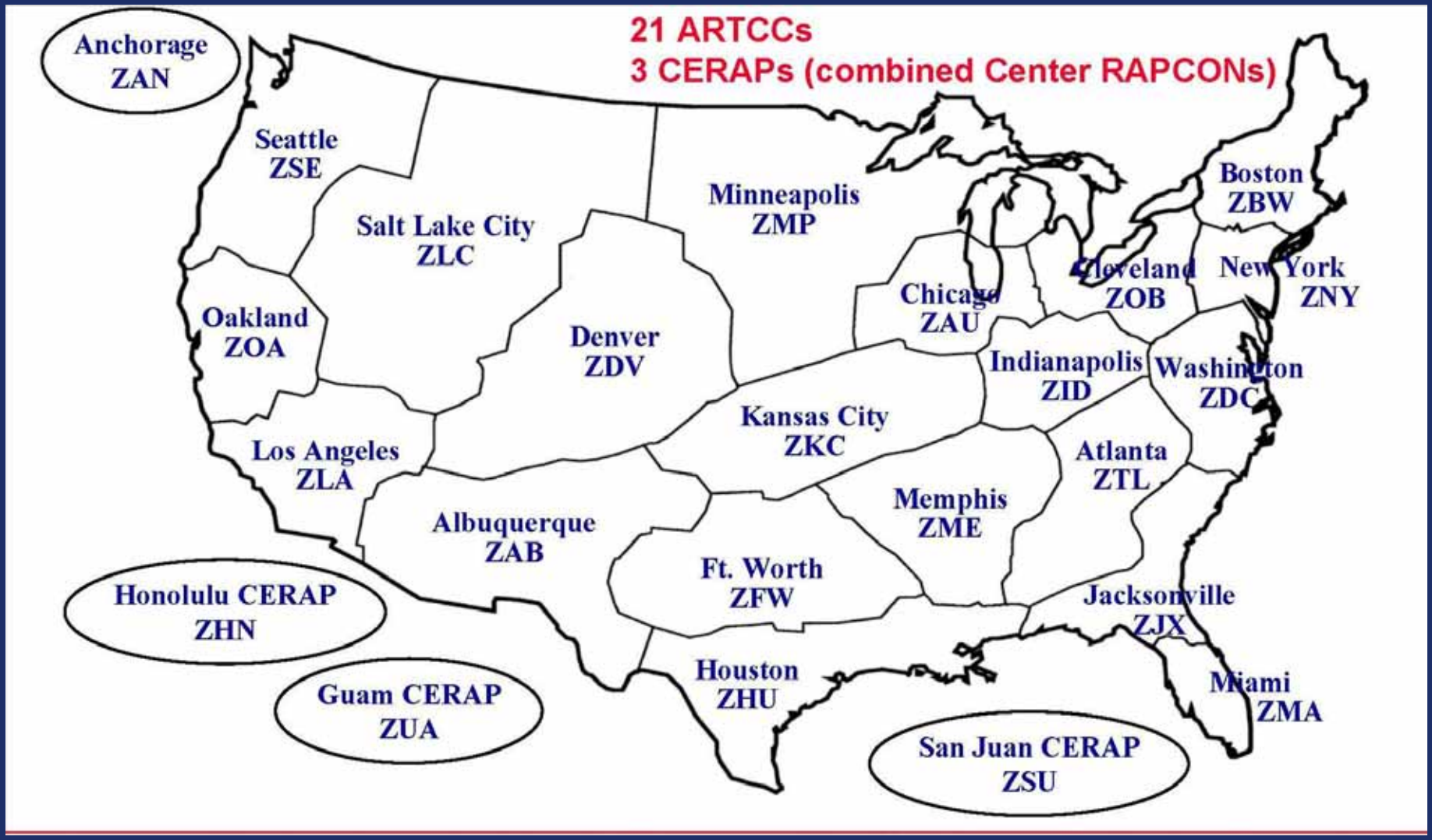
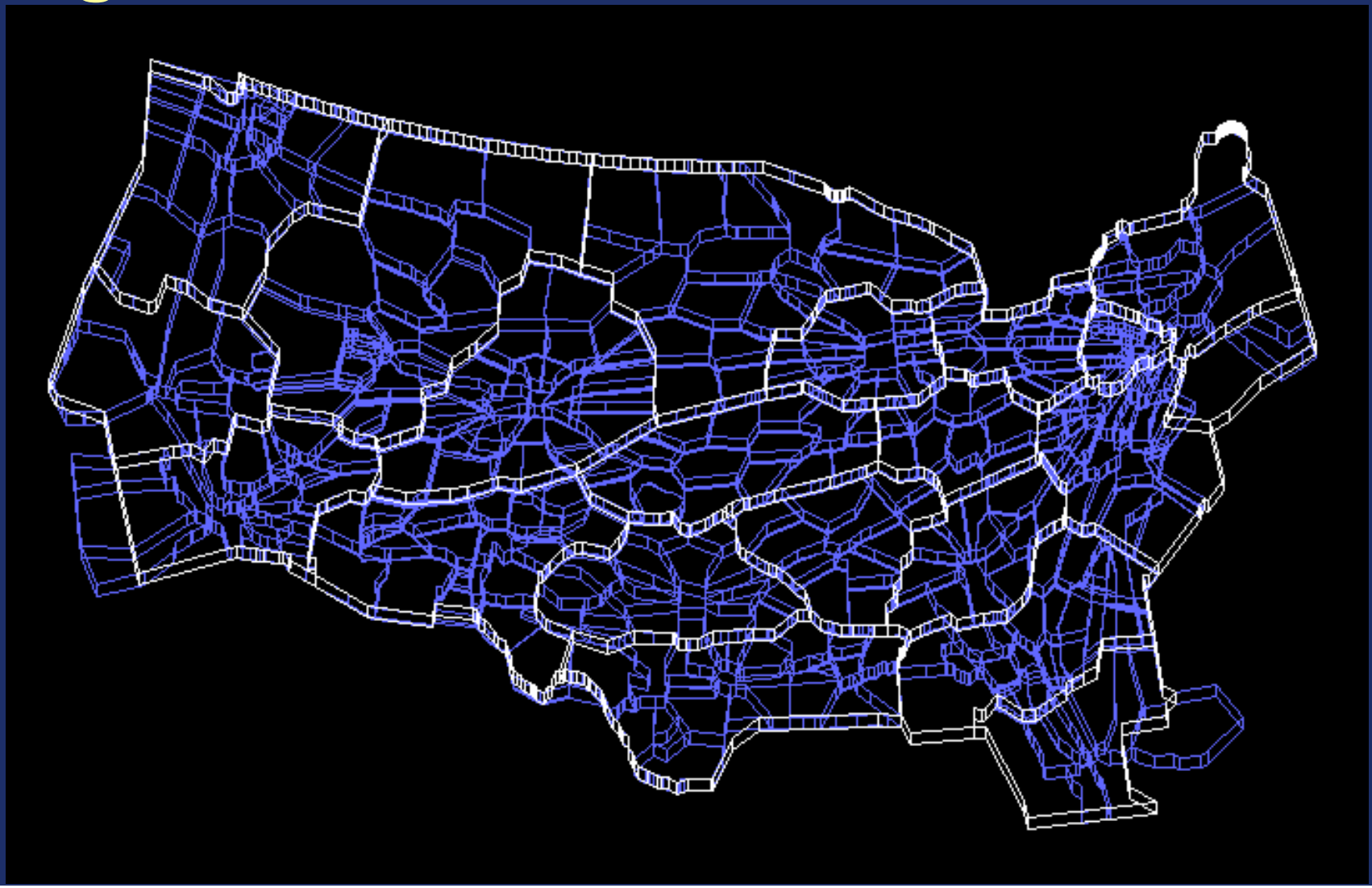
Oakland Air Route Traffic Control Center
Fremont, California

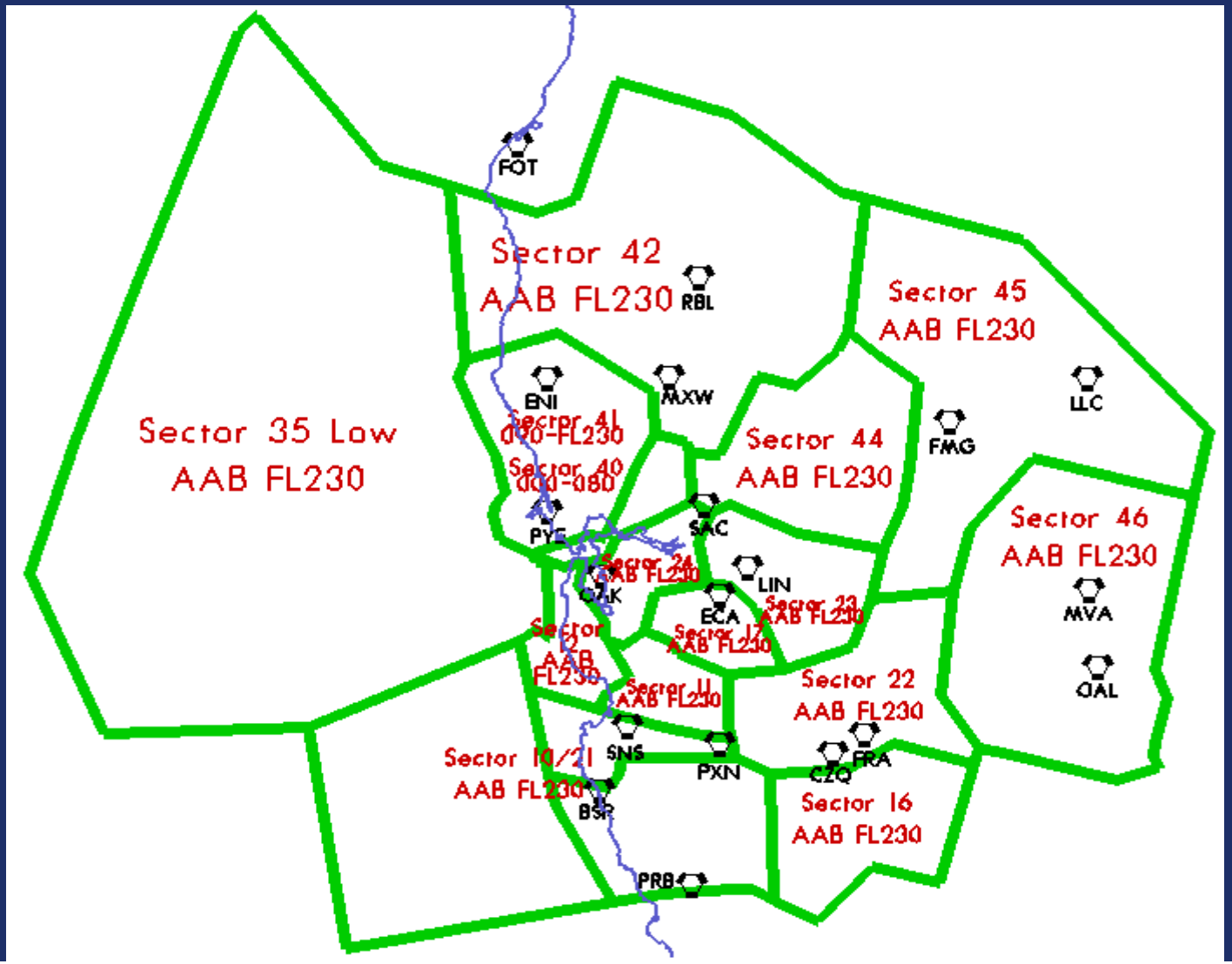
Air Route Traffic Control Centers



High Altitude Enroute Sectors



ZOA Low Altitude Sectorization



ZOA Airspace Configuration

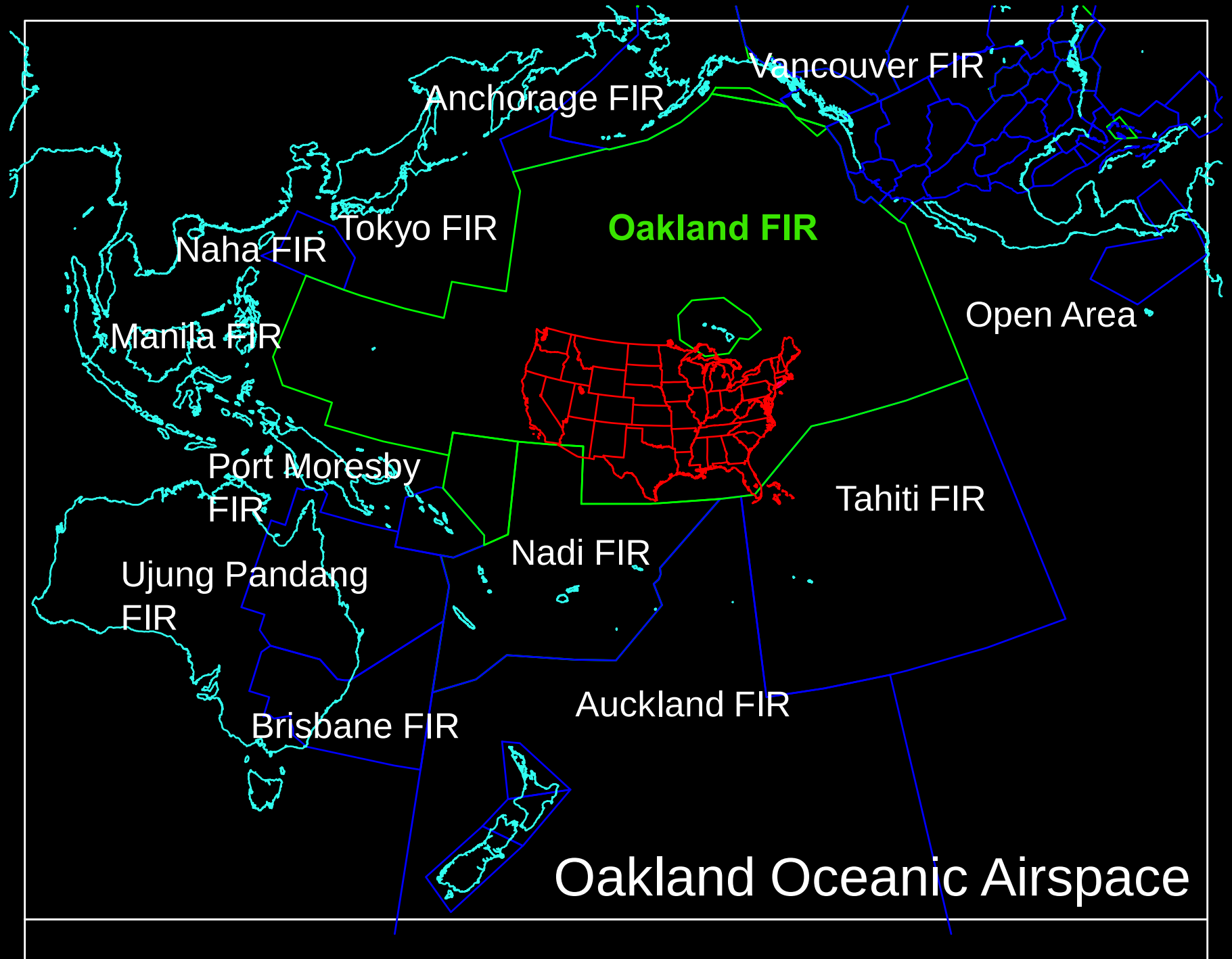
Control Responsibility for 18.8 Million Square

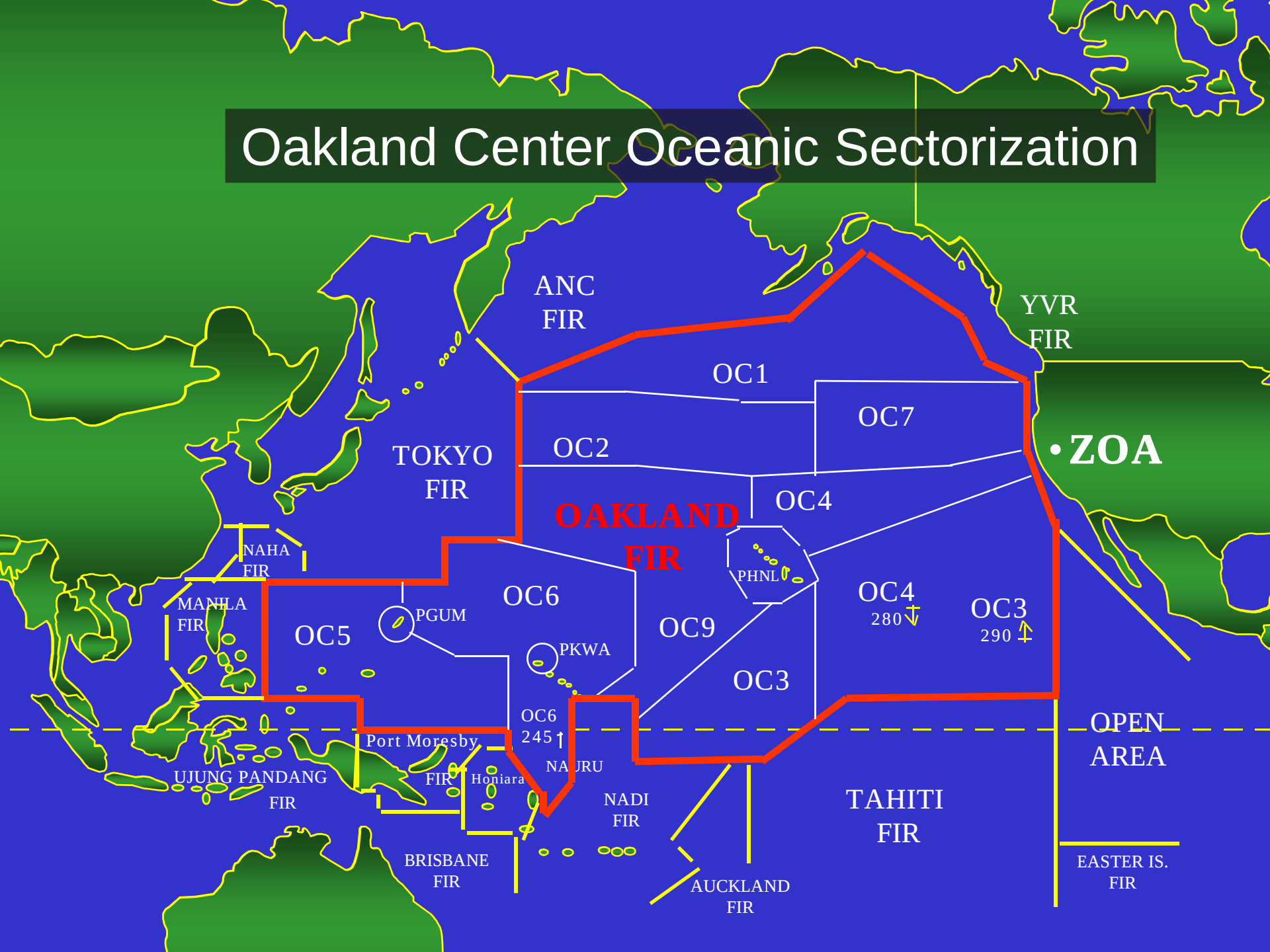
Miles of Airspace:

- –140,000 Square Miles Domestic
- –18.7 Million Square Miles Oceanic – Flight Information Region (FIR)

Within Oakland Center's oceanic boundaries

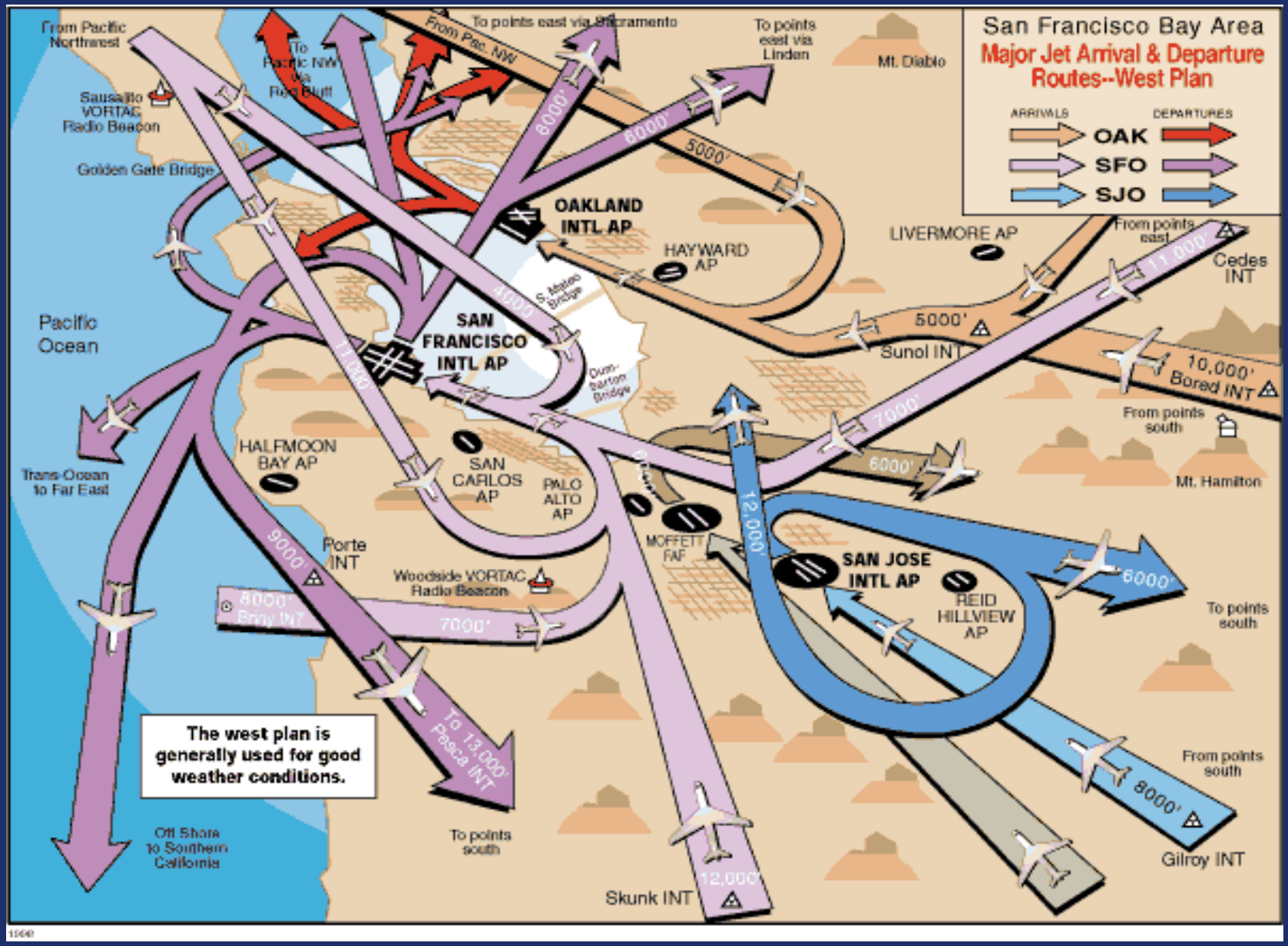
- –Largest oceanic airspace in the world controlled by one facility - 9.7% of world's surface
- –Interface with 21 different foreign and domestic facilities


Vancouver FIR
Anchorage FIR
Tokyo FIR
Oakland FIR
Naha FIR
Open Area
Manila FIR
Port Moresby FIR
Tahiti FIR
Nadi FIR
Ujung Pandang FIR
Auckland FIR
Brisbane FIR
Oakland Oceanic Airspace


Oakland Center Oceanic Sectorization
ANC
FIR
YVR
FIR
OC1
OC7
OC2
TOKYO
FIR
• ZOA
OC4
OAKLAND
FIR
NAHA
FIR
PHNL
MANILA
FIR
OC6
OC4
280
OC3
290
PGUM
OC5
OC9
PKWA
OC3
OC6
245
OPEN
AREA
Port Moresby
NAURU
UJUNG PANDANG
FIR
FIR
Honiara
NADI
FIR
TAHITI
FIR
BRISBANE
FIR
AUCKLAND
FIR
EASTER IS.
FIR

Oakland ARTCC Facility Operations

- **Domestic Control Room**
  - 3 Areas of Specialization
  - 8 High Altitude and 10 Low Altitude Sectors
  - Traffic management complex
  - National Airspace System Operations Manager (NOM) complex
  - Center Weather Service Unit (CWSU)
- **ATOP Control Room**
  - 2 oceanic areas of specialization
  - 8 Oceanic Sectors and 4 Coastal High Altitude Radar Sectors


San Francisco Bay Area
Major Jet Arrival & Departure Routes--West Plan
ARRIVALS
DEPARTURES
OAK
SFO
SJO
From Pacific Northwest
To Pacific NW via Red Bluff
From Pac. NW
To points east via Sacramento
To points east via Linden
Mt. Diablo
Sausalito VORTAC Radio Beacon
Golden Gate Bridge
OAKLAND INTL AP
HAYWARD AP
LIVERMORE AP
From points east
Cedes INT
Pacific Ocean
SAN FRANCISCO INTL AP
S. Mateo Bridge
Dum-barton Bridge
Sunol INT
10,000' Bored INT
From points south
Mt. Hamilton
HALFMOON BAY AP
SAN CARLOS AP
PALO ALTO AP
Trans-Ocean to Far East
Porte INT
Woodside VORTAC Radio Beacon
MOFFETT NAF
SAN JOSE INTL AP
REID HILLVIEW AP
To points south
From points south
Gilroy INT
The west plan is generally used for good weather conditions.
Off Shore to Southern California
To points south
Skunk INT
5000'
6000'
7000'
8000'
9000'
11,000'
12,000'
To 13,000' Peace INT
Brisy INT

What does an Air Traffic Controller DO?

Controller Perspective

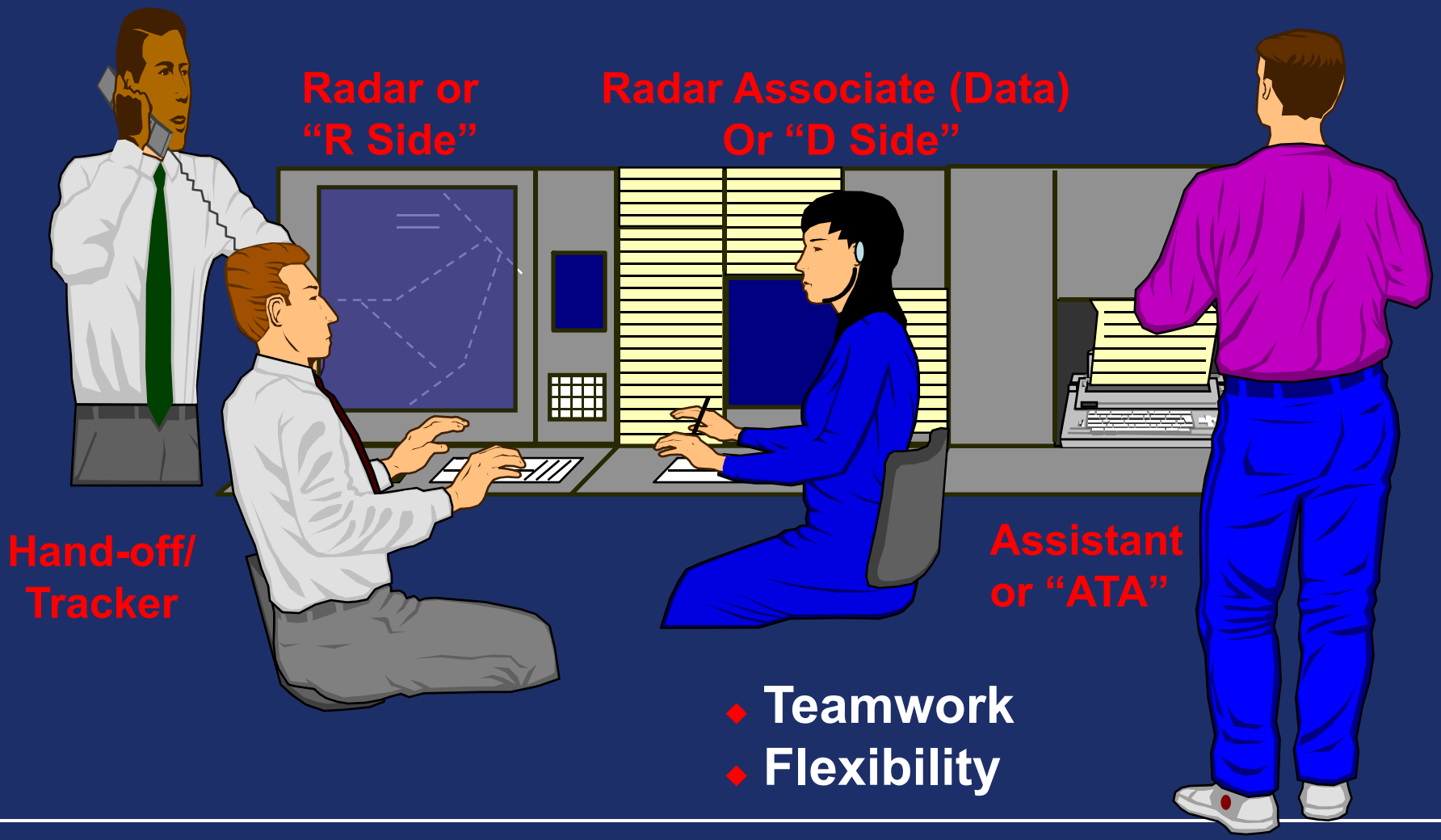
Air Traffic Control is the directing and separation of aircraft from other aircraft and obstructions.

Air Traffic Controllers also provide weather and other services as necessary to assist the flying public and military operations

The Bottom Line

Air Traffic Controllers are your "traffic cops" of the sky, keeping aircraft safely apart as they travel around the world!

ARTCC ATC Positions



- Teamwork
- Flexibility

En Route Sector Controller Roles

- **R-side (Radar controller)** - provides separation between all IFR flights in the sector; communicates directly with pilots; during light traffic works the sector alone also performing D-side duties
- **D-side** – (Radar associate controller – data): handles flight strips data and URET; detects potential traffic conflicts; coordinates with other sectors; supports R-side controller
- **ATA** – (Assistant) delivers flight strips to sectors
- **Tracker** – third controller at the sector during heavy traffic periods; detects conflicts; coordinates with other sectors
- **Supervisor** – manages controllers, trainees, equipment and other resources in the area of specialization

Enroute Training

- **FAA Academy (Oklahoma City) - 11 weeks**
  - Fundamentals of aviation and ATC
  - Classroom and simulation labs
- **Field Facility – typically 3 years to CPC**
  - Classroom (local airspace and procedures) –10 weeks
  - Assistant controller assignment
  - Radar Associate Training – 50 weeks
    - Simulation lab (DYSIM) -
    - On the Job Training (OJT)

Training (cont'd)

- **Field Facility (cont'd)**
  - Radar training – 100 weeks
    - Simulation lab (DYSIM)
    - On the Job Training (OJT)
- **Typical progression: An enroute controller spends 3 years from the start of academy training to complete all ATC training (certified professional controller – CPC). During this period, trainees are used, at times for operational staffing on positions for which they have been certified.**

Surveillance Systems (En Route)

- The Air Route Surveillance Radar (ARSR) is a long-range radar system designed to provide a display of aircraft over large areas controlled by Air Route Traffic Control Centers.
- Each ARSR site can monitor aircraft flying within a 200-mile radius of the antenna, although some stations can monitor aircraft as far away as 600 miles.
- ARSR antenna rotate at 5rpm providing sweeps at 12 second intervals.
- Data from multiple ARSR sites is presented on controller displays in a mosaic, providing radar coverage over a large geographic area.
- There are approximately 100 ARSR sites in the US.

Display System Replacement (DSR) Console

Radar Target Symbols

(Radar updates every 12 seconds)

Primary Target

Coast Track

Secondary (Beacon) Targets:

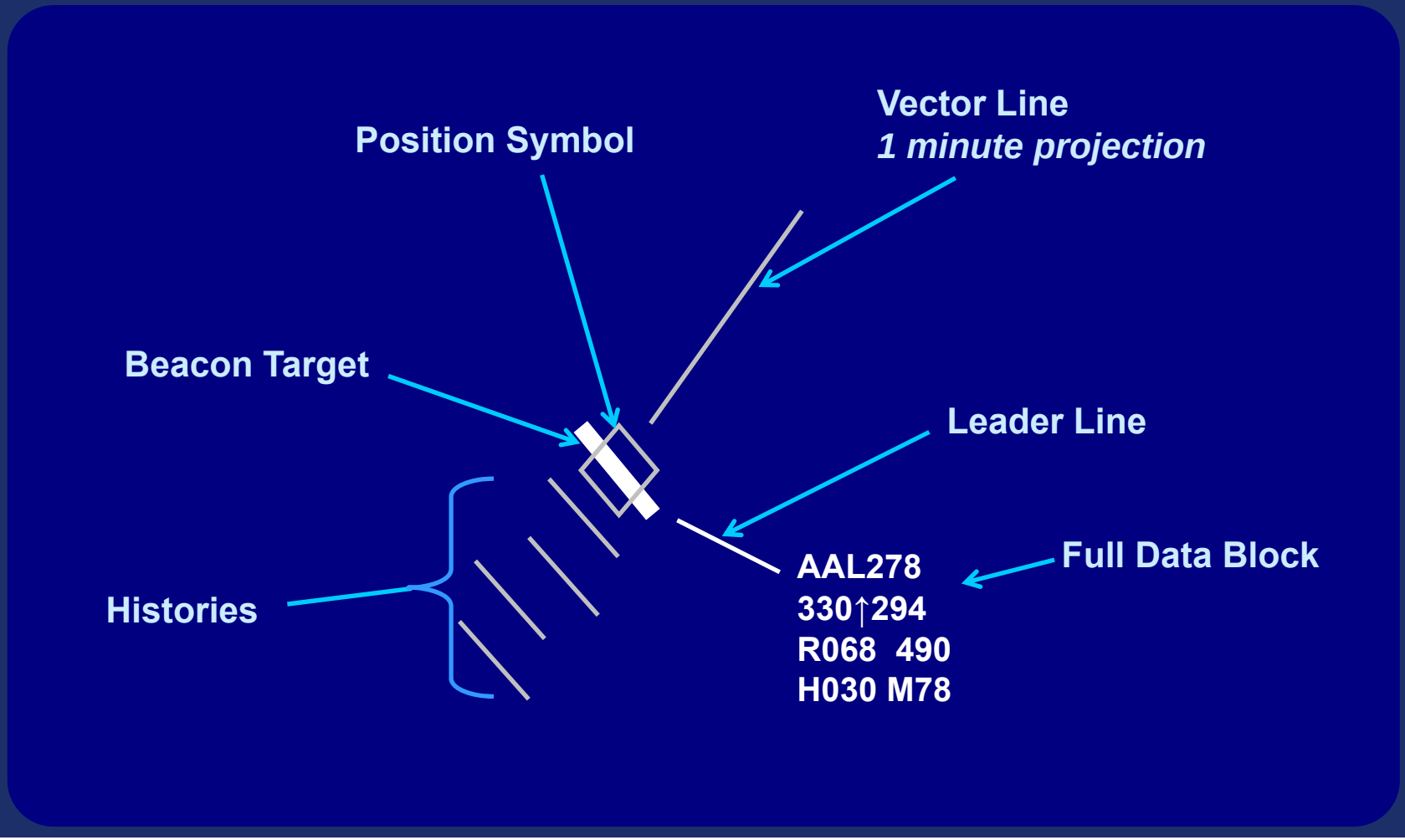
Uncorrelated Beacon

Flat Track

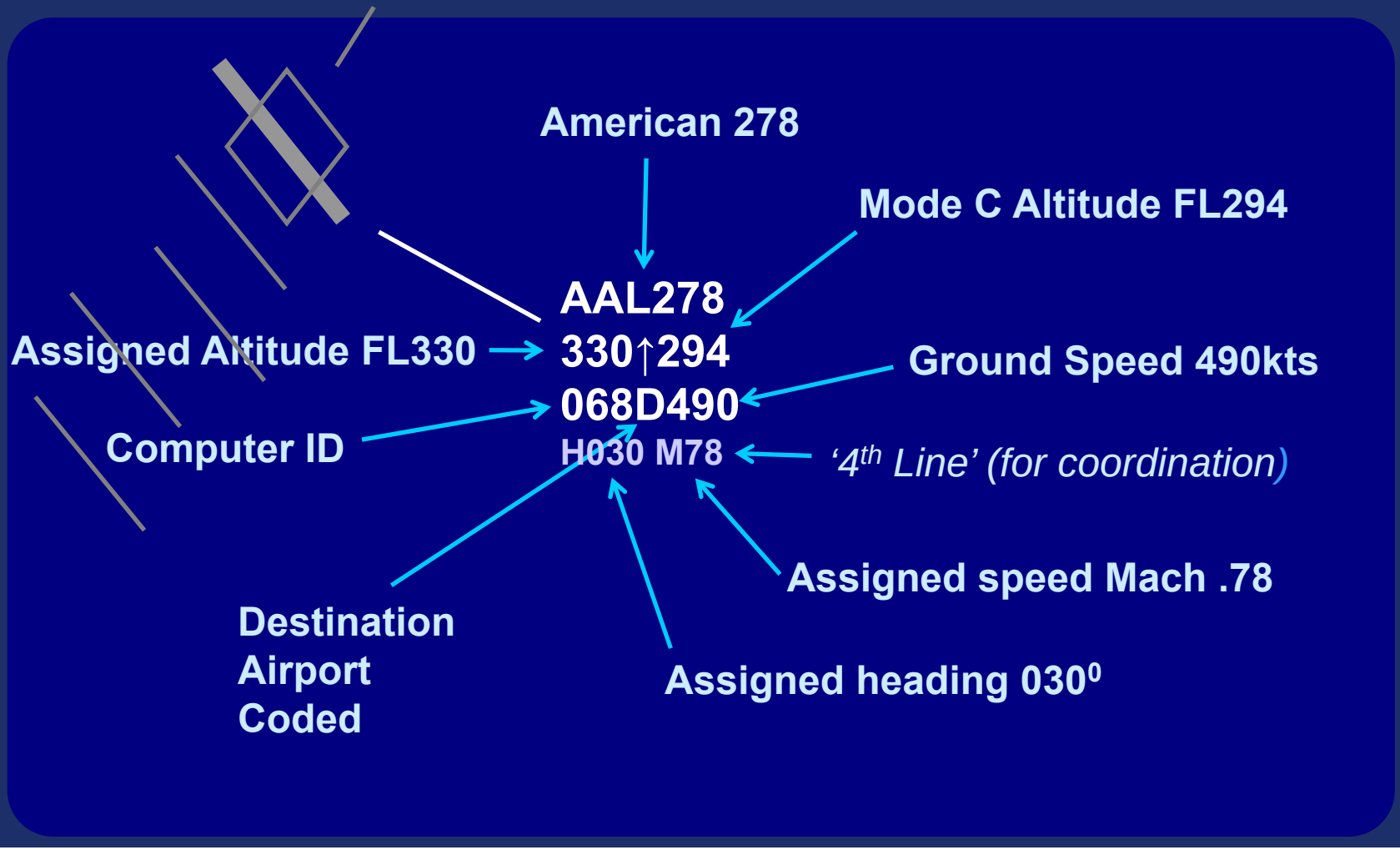
Correlated Beacon

Free Track

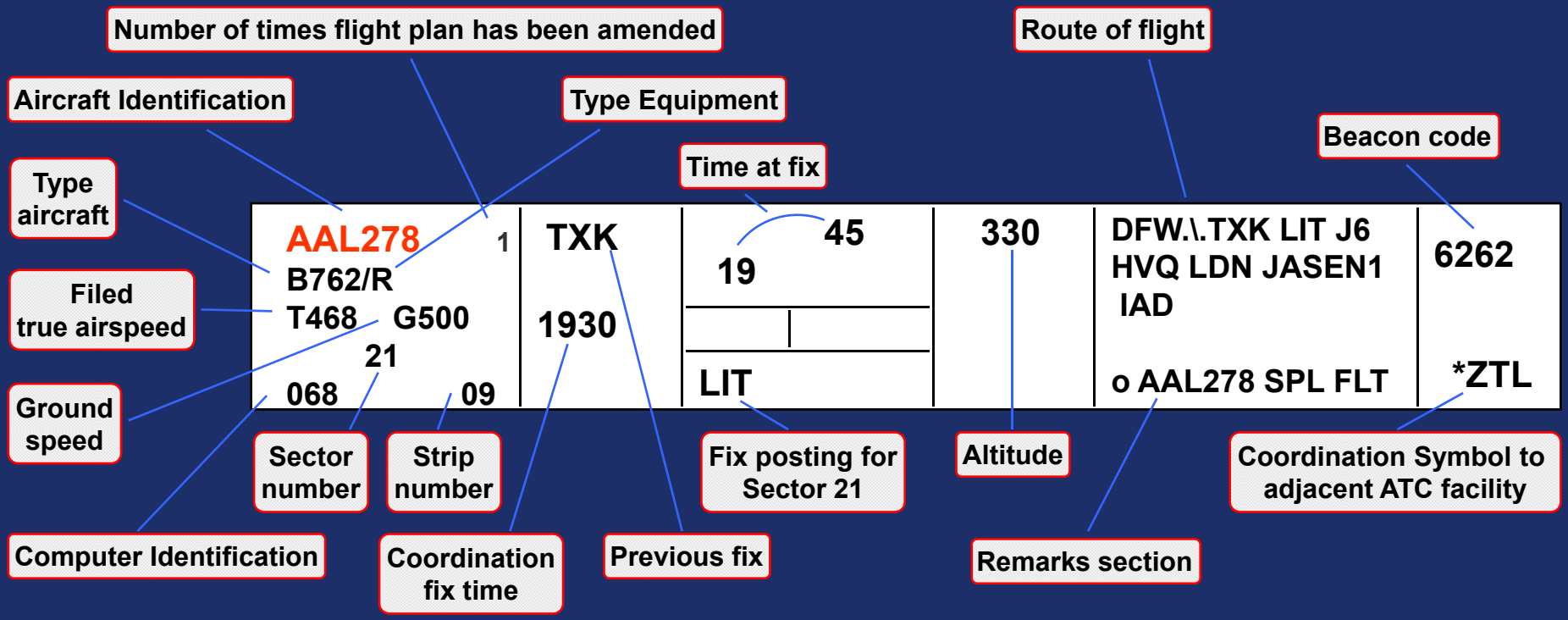
En Route Radar Target Display



En Route Full Data Block



Flight Progress Strips

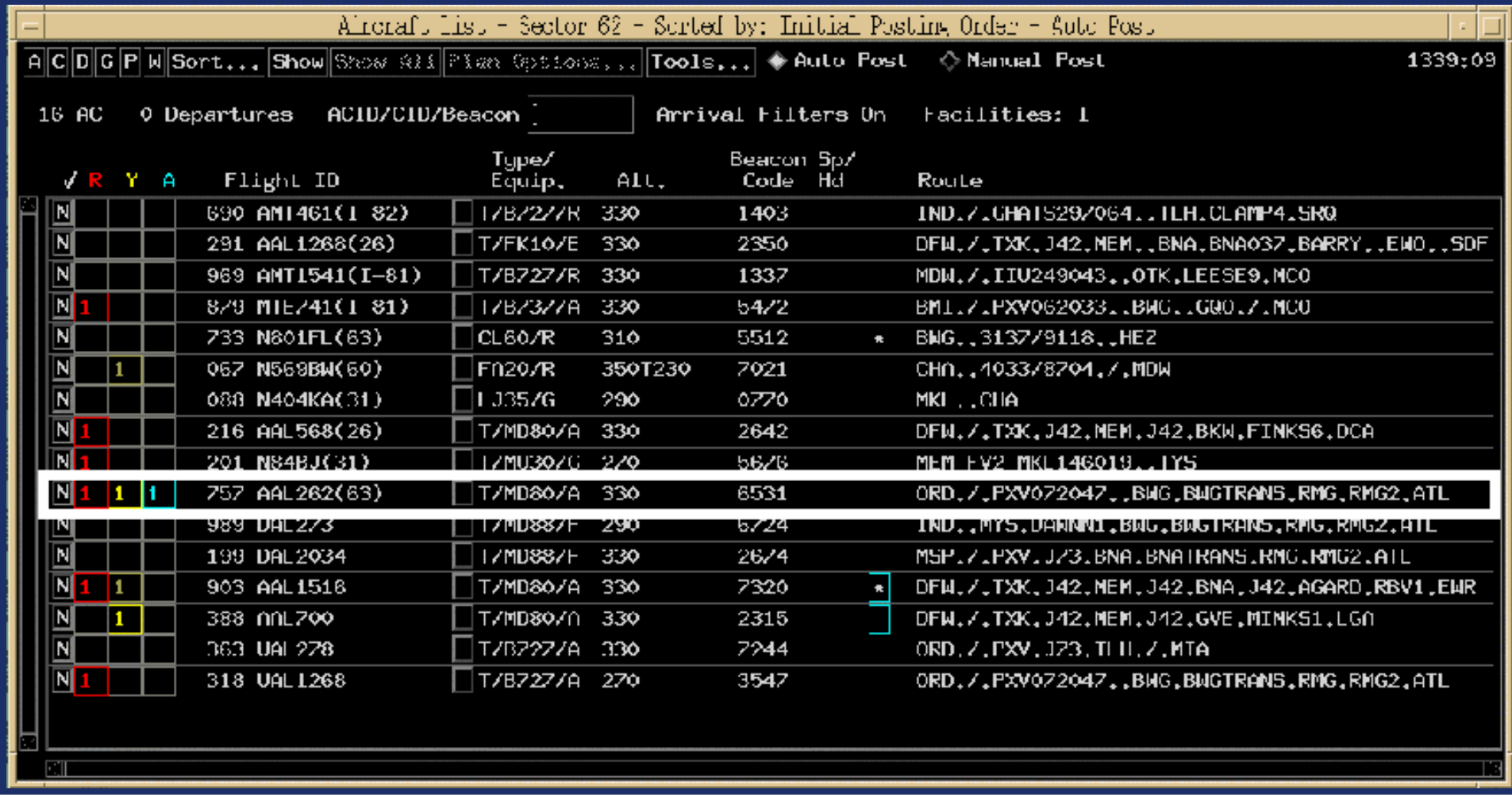


- Control Symbology
- Red/Black Strip Marking

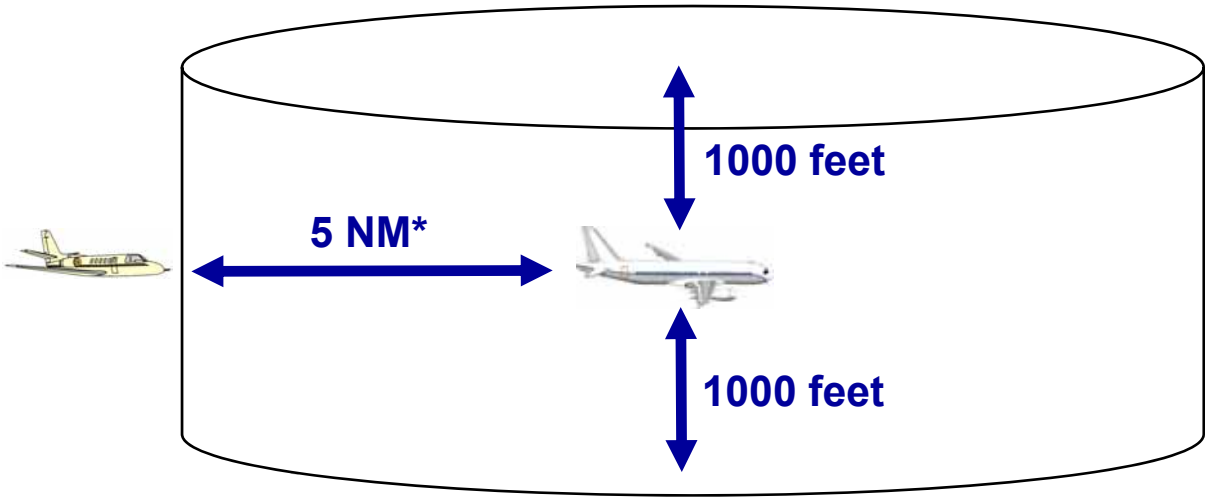
URET Panel
(User Request Evaluation Tool)

- At D-side position
- Provides electronic flight strip data
- Provides conflict detection (separate from DSR conflict alert system)
- Includes trial planner function – checks that clearances issued are conflict-free

URET Panel
(User Request Evaluation Tool)



En Route Radar Separation



* 3NM when within 40NM or more from antenna or when using single (non-mosaic) radar data source.

Ref: FAAO 7110.65, 5-5-4 Radar Minima

Vertical Separation

- **Standard – 1000’ up to FL290**
  - 2000’ at or above FL290
  - 5000’ at or above FL600
- **Reduced Vertical Separation Minima (RVSM)**
  - 1000’ from FL290 to FL 410
  - First introduced over Oceanic Airspace
  - Introduced over Domestic US (and internationally) on 1/20/05 (DRVSM)
  - Cruise operation within D/RVSM airspace requires specific avionics (more accurate altimetry and collision avoidance system), plus pilot training
  - ATC can grant exceptions to these requirements for transit through RVSM airspace to higher/lower altitudes.

En Route Radar Separation - Airspace

- Flights must be separated from other sectors and Special Use Airspace.

  En route Stage A/DARC or Stage A/EDARC:

  (a) Below Flight Level 600– 2 1/2 miles.

  (b) Flight Level 600 and above– 5 miles.

Special Use Airspace

- Alert Area
- Air Traffic Control
- Assigned Airspace
- Controlled Firing Area
- Military Operating Areas
- Prohibited Area
- Restricted Area
- Warning Area

Conflict Alert - DSR

- Tactical conflict prediction
- Alerts controller to potential loss of standard separation 3 minutes ahead
- Both aircraft data blocks flash (brighten then normal intensity)

Conflict Probe - URET

- Strategic conflict prediction
- Projects loss of standard separation up to 20 minutes ahead
- URET display and data blocks are highlighted to indicate potential conflict

Radar Handoff / Communications Transfer

- No aircraft can enter another controller's airspace without that controller's permission. That permission being automation or verbal coordination.
  - Letters of Agreement
  - Automated Information Transfer

Contact for more information:

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